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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,517	09/18/2001	Cyrus E. Tabery	G0228	8552

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EXAMINER

HASSANZADEH, PARVIZ

ART UNIT PAPER NUMBER

1763

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/955,517	Applicant(s) TABERY ET AL.	
	Examiner Parviz Hassanzadeh	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1,2 and 4-25 is/are pending in the application.
- 4a) Of the above claim(s) 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-20 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of Group I, apparatus claims 1-20 and 25, in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). It is noted that claim 3 has been cancelled by the Applicants.

Claims 21-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 5.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-20 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Kagoshima et al (US Patent Application Publication No. 2003/0003607 A1).

Kagoshima et al teach a processing system (Figs. 1, 2, 7) comprising:

a processing chamber 1 for plasma processing a wafer 1b therein (*one fabricating component operative to fabricate one or more mask features*);

a sensor unit 3 (24 in Fig. 7) for monitoring and characterizing the state of the processing the wafer, wherein the sensor unit 3 may include a scatterometry 24A (Fig. 7) for in-situ

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measuring shape and dimension of features on the surface of the wafer (*an emitting component that directs light on to at least one of the features and an analysis component that measures one or more features based on a light reflected and/or refracted from the features*); and

an actuator 4 for controlling the dry etching system according to data indicative of a recipe 6, wherein the recipe is selected according to the output of the scatterometry (Fig. 7) (paragraphs 27-32, 41-43) (*a fabrication component driving system operably connected to the fabrication component, the fabrication component driving system operable to drive the fabricating component*).

Further regarding claims 1, 5, 8, 9, 13, 15, 25: the semiconductor structure including the features as recited in the claims is considered an *intended use* of the apparatus; inclusion of material or article worked upon by a structure does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

Further regarding claims 2, : the system includes an optimum recipe calculation model 26 for processing the output of the scatterometry 24A and correlation with target value 27 (paragraphs 30).

Further regarding claims 4, 6, 7, 10, 14, 16-20, 25: the system may include a scatterometry (Fig. 7) for monitoring the state of etching process (paragraphs 41-43), wherein the scatterometry is capable of measuring depth, width of a feature.

Further regarding claims 11, 12: the actuator 4 for controlling the dry etching system according to data indicative of a recipe 6, wherein the recipe is selected according to the output of the scatterometry (Fig. 7) (paragraphs 27-32, 41-43). The actuator control any parameter

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affecting the etching condition including mass flow rate, RF power. The system further including a feed back (FB) control system and a feed forward (FF) system (paragraph 28). The system further includes a database 5 for saving data and being in communication with the recipe 6 and the monitoring sensor units 2, 3 (paragraph 27).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 4-20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Latos (US Patent No. 4,208,240) in view of Niu et al (Specular Spectroscopic scatterometry in DUV Lithography).

Latos teaches a plasma etch reactor (Fig. 1) comprising:

a plasma etch source 18 (*one fabricating component operative to fabricate one or more mask features; a fabrication component driving system operably connected to the fabrication component, the fabrication component driving system operable to drive the fabricating component*);

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an optical monitoring system including a laser source 22 (*a system for directing light on to at least one of the one or more features*),

a photo-detector 28, and a processor 42 for processing comparing the detected signal with an end point criteria 44, wherein the comparator 42 is in communication with the plasma etch source 18 (*a measuring system for measuring etching endpoint based on a light reflected from the feature*) (column 3, line 9 through column 4, line 18).

Latos fails to teach a measuring system for measuring feature parameters based on a light reflected and/or refracted from the features.

Niu et al teach a scatterometry system wherein a profile of a grating system is measured and compared to a predetermined profile (the entire document).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the scatterometry system as taught by Niu et al in the apparatus of Latos in order to perform profile analysis on the entire surface of the etching layer.

Further regarding claim 2, 6, 9-20, 25: Niu et al teach a scatterometry system wherein a profile of a grating system is measured and compared to a predetermined profile (the entire document).

Further regarding claims 4, 5, 7, 8: the apparatus includes a plasma etch reactor 18 for etching layers 14 and 16 in a predetermined pattern using photolithography technique (column 3, line 9 through column 4, line 18). The type of pattern being an aperture and a grating is considered a process limitation. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); “Apparatus claims cover what a device is, not what a device

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does” (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

Terminal Disclaimer

An attorney or agent, not of record, is not authorized to sign a terminal disclaimer in the capacity as an attorney or agent acting in a representative capacity as provided by 37 CFR 1.34 (a). See 37 CFR 1.321(b) and/or (c).

Response to Arguments

Applicant's arguments with respect to claims 1, 2, 4-20 and 25 have been considered but are moot in view of the new ground(s) of rejection. In the new ground or rejection, a scatterometry has been discussed as a mechanism for measuring a “feature parameter” formed on the surface of a substrate during an etching process, wherein the measured feature parameter is feed back into a control system for controlling the etching process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (571)272-1435. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571)272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

P. Hassanzadeh
Parviz Hassanzadeh
Primary Examiner
Art Unit 1763

March 5, 2004